

An inspection of the spring wheat chart shows production to center on the northern extension of the 60 per cent line where all the evaporation lines are rather close together and nearly parallel. Ecologically, spring wheat could as well be grouped with the crops of the north-eastern center, but geographically it belongs with the prairie climax. Edaphic considerations, then, rather than climatic, locate the area of spring wheat production. * * *

Oats center slightly north of the corn belt. Climatically, the center of production would be expected much farther northward. Edaphic reasons, and the convenience of a spring-sown crop rather than a fall-sown one to follow corn in the rotation now largely in practice in the corn belt, push the center somewhat to the south. * * *

The region south and east of the 100 per cent rainfall-evaporation ratio line is ecologically known as the southeastern evergreen center. While the rainfall throughout this part of the country is greater than it is northward, higher temperatures cause much more rapid evaporation. The physiological water requirement is higher. * * *

Cotton is the principal crop plant of this region. Eastward the extension of the southern Appalachians makes too rough a topography for the production of a cultivated crop. Temperature is the limiting factor of production northward; moisture is the limiting factor westward beyond central Texas.

Other comparisons of interest are that the fodder crops are important in New York and New England because "the lower temperatures make cereal production less profitable;" "the center of the white potato production in the Northeast bears a fairly close relation to the north-eastern evergreen center;" "the cultivated plants of the plains climax must be grown under the best known methods for saving and utilizing all the water that can be captured by the soil and under irrigation;" and "the establishment of alfalfa as an important crop at about the one hundredth meridian, where the rainfall is only six-tenths of the evaporation."

In his discussion of animal centers the writer points out that "back of the interrelations between plants and animals is the relation of both to the physical factors of their environment." "Beef cattle and swine are found centering in and slightly west of the corn belt;" "the greatest production of horses is in the region just north of the corn belt," which is also the present center of oats production.

The summary is quoted below in full:

The crop centers of the United States agree with the biotic centers. In detail this means that the corn and winter wheat belts correspond to the deciduous central forest and the prairie climaxes, the tame hay and pasture region to the northeastern evergreen forest, the cotton belt to the southeastern evergreen forest, and so on. The rainfall-evaporation ratio map is useful for the demarcation of these centers because in it are included four factors of climate, namely, relative humidity, temperature of the evaporating surface, and wind velocity as the divisor and precipitation as the dividend. These four factors are of profound importance to plant growth.

Edaphic factors frequently determine the distribution of the cultivated plants. Edaphic and climatic factors, although they may be independent of one another in their operation, sometimes cause the same agricultural practices to be employed. Economic factors modify the influence of climate and soils.

A fundamental difference between crop plants and the natural vegetation is seen when plants are found beyond their usual centers. The crops are found on the best soils only, since that is their sole chance to compete with other crops for profit. Plant invaders of the indigenous vegetation migration from their centers can offer competition in the poorest habitats only. In the better habitats the plants belonging to the center are little influenced by invaders.

In addition to the exotic crops being given the best fields, further soil modifications are usually introduced. In the extreme cases, climatic as well as soil modifications are practiced. Field plants are then grown on a comparatively large scale under glass or cloth shelter.

The domesticated animals are grouped about the centers of production of those crops upon which they are most dependent.

The methods used in studying plant succession have been used here. It is in this field of research that an accurate interpretation of conditions as consequences of the operation of physical forces of the past and present has been made. Migration, including invasion and competition, the latter implying dominance, are the direct results of interaction of climate and soils upon vegetation.

LAWN SPRINKLER AND THERMOGRAPH.

By WILLIAM G. REED, Meteorologist.

[Dated: Pomona, Cal., December 5, 1917.]

In connection with the possible effect of irrigation on the local climate the traces from the one-day thermograph

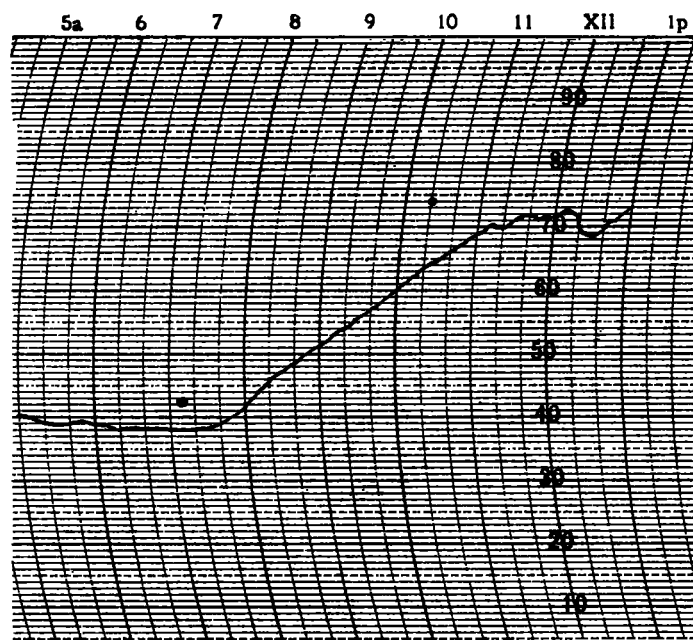


FIG. 2.—Thermogram for the City Hall lawn, Pomona, Cal., Dec. 5, 1917. Lawn sprinkler near shelter about 12:10 p. m.

and hygrograph exposed in a 1917-pattern shelter (fig. 1) on the lawn of the City Hall at Pomona, Cal., may be of interest (see figs. 2 and 3). The curves show nothing

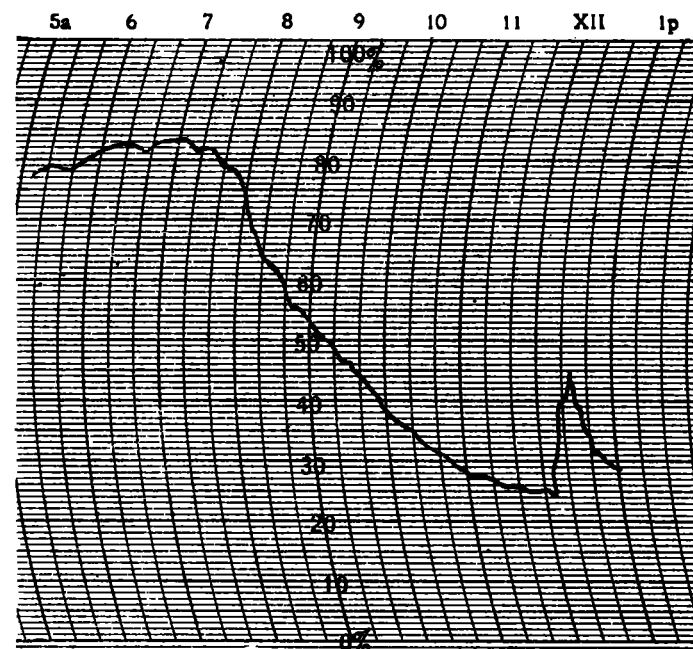


FIG. 3.—Hygrogram for the City Hall lawn, Pomona, Cal., Dec. 5, 1917. Lawn sprinkler near shelter about 12:10 p. m.

unusual until about 12:10 p. m., when the temperature fell sharply about 4 degrees in 15 minutes and the relative humidity rose 20 per cent in the same time or a

little longer. These changes appear to be the result of turning on a lawn sprinkler near the shelter.

The following table shows the effect upon the air $4\frac{1}{2}$ feet above the ground as a result of the action of a sprinkler throwing water to a height of 2 or 3 feet and continued long enough to soak the turf under the shelter.

Time.	Air temperature.	Relative humidity.	Vapor pressure.
	$^{\circ}$ F.	Per cent.	Inch.
12:10 p. m.	73.0	25	0.202
12:20 p. m.	69.0	40	0.283
12:30 p. m.	68.5	45	0.313

Although the sheets were removed from the recording instruments in about half an hour after the sprinkler was turned off and the lawn was still wet the traces show that the temperature and relative humidity in the shelter had resumed the conditions obtaining before the sprinkler was set near the shelter.

A REMARKABLE PERIODICITY OF HIGH ATMOSPHERIC PRESSURE DURING WINTER IN THE ALPS.

Under the above title Dr. J. Maurer, director of the meteorological service of Switzerland, has just pub-

lished¹ an account of a weather periodicity that promises to be of unusual interest and value.

It appears from this study that in Switzerland, according to the records of the past 50 years at Basil, Zurich, Geneva, and Lugano, the sums of the monthly pressure departures for November, December, and January, show a distinct periodicity of 8 years, with a range from maximum to minimum of, roughly, 20 millimeters. Additional Geneva records back to 1836, and Basil records to 1816, show that this 8-year period has persisted now with remarkable regularity for more than a century, and perhaps therefore very much longer.

The smoothed (apparently freely drawn) graph of the actual data is all that was used in arriving at the above conclusion. Indeed the maxima and minima are so pronounced, and so evenly spaced, as to make unnecessary, it is claimed, any special analysis, beyond mere inspection.

No cause for this special period is suggested, nor is obvious. But it indeed true it can hardly be an isolated phenomenon, and therefore should stimulate similar studies of pressure data in other parts of the world.—*W. J. H.*

¹ Archives des Sciences Physiques et Naturelles, Mai, 1918.